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Angel investors around the world

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ANGEL INVESTORS AROUND THE WORLD

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ANGEL INVESTORS AROUND THE WORLD

ABSTRACT

We document that the choice between disintermediated individual angel investments and intermediated private equity and venture capital investments depends on legal, economic, and cultural differences. We find evidence of this using PitchBook's comprehensive data on more than 5,000 angel and 80,000 private equity and venture capital investments in 96 countries from 1977 to 2012. The data further indicate that investee firms funded by angels are less likely to successfully exit through either an IPO or an acquisition. These findings are robust to propensity score matching methods, as well as to clustering standard errors and excluding U.S. observations, among other approaches.

Keywords: Private Equity, Angel Investor, Venture Capital, Entrepreneurship, Law and Finance, Culture

ANGEL INVESTORS AROUND THE WORLD

"What bugs me is this whole start-up scene is a lifestyle, and there are these [angel] investors who think it's sexy and want to be part of that lifestyle."

-- New York Times, December 2015, "Tips for the Aspiring Angel Investor"[1]

INTRODUCTION

International business, law, economics, and finance scholars have written about how institutional environments shape organizational structures and practices (Brouthers, 2002; Berry, Guillen, and Zhou, 2010; Choi and Contractor, 2016; Cumming, Filatotchev, Knill, Reeb, and Senbet, 2017; Miletkov, Poulsen, and Wintoki, 2017). Yet, there are few studies that consider at the level of the individual investor the relationship between the organization and its environment (Henisz and Swaminathan, 2008; Peng, Wang, and Jiang, 2008; Cantwell, Dunning, and Lundan, 2010; Regner and Edman, 2014; Van Hoorn and Maseland, 2016; El Ghoul, Guedhami, and Kim, 2017; Smit, Pennings, and Van Bekkum, 2017). We attempt to address this by examining the contexts that favor individual investors over private equity (PE) and venture capital (VC) investors.

The first "angel investors" were wealthy individuals who funded expensive Broadway productions. William Wetzel (1983) adopted the term in his pioneering study of the raising of seed capital in the U.S., using it to describe investors who fund entrepreneurs. The colorful quote with which we begin this paper illustrates the oft-repeated view that there is a cultural dimension to angel investing. Still, there is little theory or evidence on angel investment in most parts of the world, and equally neglected is the impact of international differences in cultural and legal institutions on incidences of angel investments and on their outcomes--certainly in contrast to the considerable PE and VC literatures (Cumming, Fleming, and Schwienbacher, 2006; Batjargal, 2007; Guler and McGahan, 2007; Zacharakis, McMullen, and Shepherd, 2007; Madhaven and Iriyama, 2009; Cumming, Schmidt, and Walz, 2010; Cumming and Walz, 2010; Guler and Guillen, 2010; Iriyama, Li, and Madhaven, 2010; Gu and

[1] Daniel L. Gottfried gives no-nonsense angel-investing advice in a Paul Sullivan Money Matters column. http://www.nytimes.com/2015/10/03/your-money/tips-for-the-aspiring-angel-investor.html?_r=0

Lu, 2010; Cumming and Knill, 2012; Li and Zahra, 2012; Cumming, Syvrud, and Knill, 2016; Dai and Nahata, 2016).

We seek to add to the angel investing literature by examining how institutional theory can explain the relative importance of angel and PE and VC investment across countries. We shed light on how angel investment differs from PE and VC investment around the world, and how it is affected by the legal and cultural environment. Our analysis exploits the comprehensive data collected at the deal level of investee firms from PitchBook, which describes 85,940 completed deals in 96 countries from 1977 to 2012. Among those deals, 5,397 from 42 countries involve angels (either as single funders or as participants in co-invested or syndicated PE and VC funds). The dataset allows us to directly compare disintermediated angel and intermediated PE and VC investments at both deal and investee-firm level.

The data indicate that, relative to PE and VC funds, angels invest in smaller, more active entrepreneurial firms that tend to be located in countries characterized by less effective legal environments and higher levels of individualism and risk-taking. This is the case for both first-round and later deals. The data also show that, relative to firms funded by PE and VC funds, those funded by angels have a lower probability of successful exits, through either an initial public offering (IPO) or an acquisition, although the difference is smaller in countries with a more effective legal environment, especially for IPO exits (Nahata, 2008; Nahata, Hazaruka, and Tandon, 2014). Moreover, we find no evidence in our subsample tests that angels provide a "stepping stone" to investee firms as some have suggested, but rather that a firm that receives angel investment in the first round has a lower probability of successfully exiting in later stages. A limitation of our data is that there is no natural experiment that enables a direct assessment of causality; nevertheless, we do as much as possible with the data to assess robustness. Our results are robust to various clustering methods to correct standard errors while controlling for fixed effects, and also to the use of propensity score matching.

The existing literature focuses more often on PE and VC than angel financing. The reason, we believe, for the comparative lack of work on angel investment lies in the fact that, in contrast to PE and VC deals, data on angel deals are limited. Nonetheless, prior research has established that angels are playing an increasingly important role in funding entrepreneurs at the seed and early stages, and indeed their importance in the entrepreneurial economy

has been recognized even more in recent years (Wetzel, 1987; Freear, Sohl, and Wetzel 1994; Mason and Harrison, 1995; Morrissette, 2007). Additional research on angels is clearly warranted as many studies have found their importance to start-ups to be equal to that of VCs, with the angel total market being approximately the same size as the VC one (Sohl, 2003; Freear and Sohl, 2001; Mason and Harrison, 2002; Goldfarb, Hoberg, Kirsch, and Triantis, 2007; Sudek, Mitteness, and Baucus, 2008; Shane, 2009; OECD report, 2011). Our paper will contribute to a small but growing literature on angel investing.

Angels usually are found among the friends and family members of entrepreneurs. Their financial support can consist of a one-time injection or can be ongoing over a start-up's lifecycle. In addition to financial support, angels often provide managerial assistance and coaching (Freear, Sohl, and Wetzel, 1992; Shane, 2009; Maxwell, Jeffrey, and Lévesque, 2011). Angels prefer to invest in local firms, and in general do not use conventional control mechanisms, such as entering contracts, sitting on boards, or staging financing, and they hold smaller positions in investee firms than VCs (Wong, Bhatia, and Freeman, 2009; Wong, 2010; ARI Halo Report, 2015).

Recent empirical studies of angels focus on their contributions to investee firms and on angel-VC differences. Using a regression discontinuity analysis, Kerr, Lerner, and Schoar (2014) found that angels can improve the survival, exits, employment, patenting, web traffic, and financing of investee firms. Although based on the investments of only two angel groups, their findings do confirm the positive side of angel group financing in that the firms that were funded achieved successful exits and reached high employment levels. In another recent study, Lerner, Schoar, Sokolinski, and Wilson (2015) extended the results of Kerr et al. (2014) to an international setting, looking at 13 angel groups from 12 countries, and confirming similar positive outcomes. However, neither of the studies investigated the relationships between angels and VCs. Hellmann, Schure, and Vo (2015) did consider how angels and VCs interact and found that angel and VC funding are dynamic substitutes, and firms that obtained more angel financing in the past are less likely to subsequently obtain VC funding. Their results also suggest that VC funding is associated with better exit outcomes. Dutta and Folta (2016) found that VC-funded firms have higher successful exit rates, but they also found that, based on patent data, the impact of angels on improving innovation rates is similar to that of VC firms.

There are also several theoretical studies that have built a useful foundation in comparing angels and VCs. Under the assumption that angels do not add value to investee firms while VCs do, Chemmanur and Chen (2014) developed a model that explains the reasons why entrepreneurs might want to obtain angel financing before approaching VCs. Schwienbacher (2009) assumed that both angels and VCs can add value and his model explains the choice entrepreneurs make between angels and VCs for early-stage financing. Hellmann and Thiele (2015) provide a "friends or foes" theory that explicitly models the interdependences between angels and VCs. The model assumes that investee firms want to proceed from angel financing to VC financing; however, angels may be squeezed out in later stages by VCs making use of their market power. Angels need to seek alternative exit routes when they face such a situation. One key insight is that the bargaining dynamics between angels and VCs may determine whether their relationship is complementary or substitutionary.

Our paper builds on these important studies by providing large sample empirical evidence on the choice between angel and PE and VC investment around the world. To the best of our knowledge, our study is the first to use a multi-country private equity deal-level database to contrast the investments of angels and those of PE and VC investors. We not only document angel investing around the world but also show how legal and cultural differences are associated with disintermediated angel investments versus intermediated PE and VC investments.

The remainder of this paper is organized as follows. In the next section we discuss the prior literature and develop our hypotheses. We then present the data and our summary statistics, followed by regression analyses and robustness checks. In the final sections we discuss some limitations of the dataset as well as possible extensions, we then make concluding remarks and suggestions for future research.

INSTITUTIONAL THEORY AND HYPOTHESES ON ANGEL INVESTMENT COMPARED TO PRIVATE EQUITY AND VENTURE CAPITAL FUND INVESTMENT

Extant research shows that PE and VC investments can be catalysts for entrepreneurial growth and innovation, thus having a significant role in spawning economic growth around the world (Timmons and Bygrave, 1986; Grossman and Helpman, 1991; Gompers and Lerner, 1999; Cumming and Johan, 2013; Makhene, 2009). Yet by

and large, prior angel investment studies focus on just the U.S. market (Kerr et al., 2014; Dutta and Folta, 2016). There are notable exceptions of studies that consider differences between angel and PE and VC investment outside the U.S. Mason and Harrison (2002) look at U.K. angel investments using survey methods, while Li, Shi, Wu, Wu, and Zheng (2016) discuss Chinese government policies that promote angel investment, and Ding, Sun, and Au (2014) compare the selection criteria used by angels in China and Denmark. Still, like most others, these studies make single-country or two-country comparisons of angels, but do not consider institutional differences between angel and PE and VC investments in an international setting. The only international angel study that we are aware of is that of Lerner et al. (2015) which uses a small dataset from 13 angel groups in 12 countries, but not angel activity outside of grouped investments, and hence is not representative of the broader set of all angel activities (Bonini, Capizzi, Valletta, and Zocchi, 2018); the inconsistencies are even directly highlighted by inconsistencies between the detailed Italian data of Bonini et al. (2018) and the small sample of Lerner et al. (2015). In the VC and entrepreneurship literatures, international studies have highlighted that institutional differences matter for financial markets and economic development as well as for the contractual provisions and oversight intensity of PE and VC fund transactions (Cumming and Johan, 2013; Nahata et al., 2014; Lerner and Schoar, 2005; El Ghoul et al., 2017; Cumming et al., 2017). However, previous studies of angels have not considered such international differences. Our study fills this gap by investigating how differences in institutional environments affect the choice between angel and PE and VC investments.

Angels have a long history as informal investors within the narrow subset of the PE market (Lamoreaux, Levenstein, and Sokoloff, 2004; Shane, 2009). There is a current trend for them to form groups and networks that pool money in order to make larger investments like the seed-stage funding of VC investors (Shane, 2012; Kerr et al., 2014; Lerner et al., 2015; Bonini et al., 2018). So far, these only account for about 2% of total angel investment (Wiltbank and Boeker, 2007) and their investment profiles are different from those of individual angels (Bonini et al., 2018). Again, our study makes an important contribution as it sheds more light on individual angels.

Prior literature has outlined several major differences between angels and PE and VC investors. First, angels prefer investing in the seed or early stages of the start-up, while PE and VC funds usually participate in later-stage deals when firms have become more mature. Second, angels select projects based on personal relationships and use

relatively informal procedures (Sudek, 2006), while PE and VC funds use more sophisticated screening processes, due diligence and term sheet tools to build their portfolios (Cumming and Johan, 2013). Third, investment amounts are much smaller for angels (Ibrahim, 2008). Although Sohl (2003) estimated that around 300,000 to 350,000 angels in the U.S. invest about $30 billion in about 50,000 firms yearly, the average investment amount was roughly one to two million. Fourth, angels use their own money (Van Osnabrugge, 2000), while PE and VC funds act as financial intermediaries in investing in private firms on behalf of their investors (Avdeitchikova, Landstrom, and Mansson, 2008).

In agency theory terms, angels are principals in their own investments who bear all the downside risks of failure while PE and VC funds act as agents who can mitigate such risks (Edelman, Manolova, and Brush, 2017). Therefore, they face different incentives and constraints and their investment risk tolerance profile and expected returns should be different. Aernoudt (1999) estimated that angels expect returns of around 20% while PE and VC funds look for projects with expected returns of around 35% to 45%. In addition, PE and VC funds charge management fees of 1-2% and a carried interest of 10-30% (Johan and Najar, 2010), while angels do not have institutional investors and hence do not have similar compensation structures. Moreover, according to the survey done by Shane (2005), angels do not invest purely for financial gain, but for a variety of other reasons, from economic, like creating and growing companies, to social, such as supporting the community. They might invest to benefit a known partner or for personal reasons, for instance, finding a job, making use of an expertise, learning something new, even just for the fun of it. This makes the aims of angel investors quite different from those of PE and VC investors; angels invest in persons more than companies, and although they do want the companies in which they invest to succeed, it is not merely so they will profit from that.

Given the differences outlined above and the fact that angels invest their own capital, and thus are free of outside financial intermediation while PE and VC funds act as intermediaries between large institutional investors and entrepreneurial firms, we expect that the differences between angel investments and PE and VC investments will be more pronounced when legal, economic, and cultural conditions diverge, even when controlling for investment type. The literature has shown that institutional factors such as opportunity perception, legal

framework, and culture influence the emergence of angel investments (Edelman et al., 2017); our study takes a step further in comparing the investments of angels and PE and VC funds from an institutional perspective.

In addition, while it is well established that PE and VC investment help foster better economic conditions, stock market development, and legal protection for minority shareholders, as well as cultures that favor entrepreneurship development (Nahata et al., 2014), our study looks at how these factors influence angel investing and the opportunities for exit relative to PE and VC funding. In contrast to PE and VC funds, angel investors are not constrained by institutional investor veto rights, annual (or semi-annual or quarterly) report monitoring, or by limited partnership agreements. As a result, angel investors are more prone to behavioral biases than PE and VC funds (Van Osnabrugge, 2000; Forrester, 2014), although VC investors do also have some biases (Franke, Gruber, Harhoff, and Henkel, 2006, 2008). Similarly, individual investors in public equity markets are subject to behavioral biases that are more pronounced than those of institutional investors (Barber and Odean, 2000). As we have said, angels invest their own money directly and often not only for purely financial reasons. On the other hand, PE and VC fund managers do not risk their own money and are motivated primarily by financial reasons. Thus, the legal environment will surely differentiate angels from PE and VC funds. Compared to PE and VC funds, individuals are generally more financially constrained in economic downturns. Because angel investment decisions are made alone and so may be more subject to behavioral biases, they are more likely to be impacted by economic conditions. Furthermore, we know from a large literature documenting the importance of national culture that it will shape the behavior and decision-making processes of individuals and organizations (Salter and Niswander, 1995; Schwartz, 1999, 2014; Tung and Verbeke, 2010; Hofstede, 2010; Ronen and Shenkar, 2013; Boubakri, Guedhami, Kwok, and Saffar, 2016; Beugelsdijk, Kostova, and Roth, 2017; Devinney and Hohberger, 2017; Kirkman, Lowe, and Gibson, 2017; Griffin, Guedhami, Kwok, Li, and Shao, 2017; Mingo, Morales, and Dau, 2018). Making investment decisions by themselves, leads angels to be involved in the very early-stages of start-up development, and as a result to bear all the downside risks; their investments are consequently more likely to be influenced by the cultural environment than those of PE and VC funds. Hence:

Hypothesis 1: *Angel investment is more sensitive than PE and VC investment to international differences in legal, economic, and cultural conditions.*

PE and VC funds can provide start-ups with benefits such as certification, guidance, and networks. Previous studies have shown that certification and endorsement improve investment performance and facilitate exits (Megginson and Weiss, 1991; Stuart, Hoang, and Hybels, 1999; Hsu, 2004; Hochberg, Ljungqvist, and Lu, 2007; Dutta and Folta, 2016). Angels differ from PE and VC funds in terms of the kind of relationship formed with investee firms and the scale and scope of the investment process. Some VC investors do not perceive angels as a source of risk reduction or as return enhancers (Heukamp, Liechtenstein, and Wakeling, 2007), and entrepreneurs have relatively higher levels of conflict with angels, which leads to early exits (Collewaert, 2012). In this sense, angels may be less likely to bring a certification effect to investee firms, especially during divestment stages.

Angel investors tend to take minority common equity stakes in entrepreneurial firms without using onerous control rights (Wong et al., 2009; Wong, 2010). By contrast, VC investors tend to use much stronger control rights in an attempt to mitigate agency conflicts and to improve the chances of exit (Cumming and Johan, 2013). As such, legal environments that afford stronger protection to minority investors will improve the exit outcomes of angel investors, all else being equal, because country-level minority investor protection can substitute for the lack of direct contractual protection in angel deals. Therefore, firms funded by angels should have fewer successful exits than those funded by PE and VC investors, but the difference should be less pronounced in countries with better minority investor protection. Therefore:

Hypothesis 2a: *Firms funded by angel investors will have a lower probability of achieving successful exits by IPO or acquisition than firms funded by PE and VC investors, but the difference will be less pronounced in countries with stronger minority investor protection.*

Although angels might not be as good as PE and VC investors at facilitating IPO or acquisition exits, their investment at an early stage may still send a positive signal to future investors and that enables further credit

through the investment process (Elitzur and Gavious, 2003). Moreover, studies have shown that PE and VC funds rarely invest in companies which previously received angel funding; only a very small fraction of those companies attract PE and VC funding later on (Shane, 2009). However, Elitzur and Gavious (2003) found that angels can provide certification to improve the outcome of entrepreneur-VC transactions, and Schwienbacher (2007) predicts that theoretically the most promising ventures seek angel capital first in order to achieve an intermediate milestone before contacting VC investors to minimize dilution. So if angel-funded firms finally succeed in exiting through IPOs or acquisitions, angels can be said to provide certification (Kerr et al., 2014). This is similar to the commonly held view that angel financing is a stepping stone[2] to obtaining venture capital, and angels and VC investors are synergistic members of a common financing ecosystem (Hellmann et al., 2015). Google, Facebook, and Tesla Motors are examples of the stepping-stone logic. We therefore expect that firms which have received angel investments in the first round may have a better chance of exiting successfully by an IPO or an acquisition.

Hypothesis 2b: *Firms funded by angel investors in the first round will have a relatively higher probability of achieving a successful exit by IPO or acquisition.*

DATA AND SUMMARY STATISTICS

Our analysis exploits the comprehensive PitchBook database which provides information at the deal level on 85,940 deals completed between 1977 and 2012 in 42,617 investee firms from 96 countries. Angels funded, either by themselves or with private equity and venture capital investors, 5,397 of those deals in 4,266 investee firms from 42 countries. This dataset allows us to compare angel and PE and VC funding.

Figures 1 and 2 track angel and PE and VC investments between 1977 and 2012. Over this 36-year period, there was an increase in both angel and PE and VC investment, with small setbacks during the dot-com bubble and the recent financial crisis. Compared with PE and VC funds, angel funding, as measured by the total number of deals per year, seems to have better weathered the recent financial crisis. Our graphs show that angels and PE and

[2] As venture capitalist Marc Andreessen said during a lecture entitled, “How to Raise Money”, "So by far the best way to get the introductions to the A stage venture firms is to work through the seed investors." (https://genius.com/Marc-andreessen-lecture-9-how-to-raise-money-annotated)

VC funds have different profiles. Figure 1 indicates that total deal sizes for angels peaked in 2007 after which they shrank and continued shrinking until 2012, while for PE and VC funds deal size was much more synchronized with the total number of deals completed (Figure 2).

[Insert Figures 1 and 2 About Here]

Table 1 shows the sample distribution of completed deals across the world. Table 1, Panel A, presents the Top 10 countries for completed deals made by all investors, angel investors, and PE and VC investors. The U.S., Canada, and the U.K. are always the top three recipients in each of those categories. Most of the Top 10 recipients are OECD countries, with the exception of India and China. Most deals involve software and other high-growth and high-tech industries. Compared to PE and VC investors, angels are more active in the retail industry.

[Insert Table 1 About Here]

In Table 2, Panel A, we focus on investee firm-level characteristics. For each of the 42 countries in which there are completed angel deals, we calculate the total number of investee firms, the percentage of firms with angel financing (in all rounds), the percentage of firms with first round angel financing, and the percentage of firms with successful exits. On average, angels financed about 11% of firms in those 42 countries, about 8% in first round financing; about 24% of those investee firms had successful exits through IPOs or acquisitions. Table 2, Panel B, presents the same information at the deal level. While there are on average more than 2,000 deals completed each year for each country, only about 7% involve angels. This is not surprising, as angel data are rarely available and PitchBook only captures some of the big and prominent players in this market. Furthermore, only 5% of those deals receive angel first round financing, and about 15% result in successful exits.

[Insert Table 2 About Here]

Table 3 provides information on the main variables in our dataset. Our main dependent variables are dummies for All Angel deals, Pure Angel deals, and Mixed Angel deals. Explanatory variables include GDP per capita to measure economic conditions, domestic stock market capitalization and the Morgan Stanley Capital International (MSCI) stock market returns to measure each country's stock market conditions, an index of minority shareholders protection to measure the quality of the legal environment, Ronen and Shenkar (2013) cultural zones and Hofstede's dimensions to measure cultural conditions, as well as a variety of other control variables to capture investee firm and industry characteristics. Our sample shows that there are many differences between angel and PE and VC investments.

[Insert Table 3 About Here]

In Table 4, we present a pair-wise correlation matrix for each of our variables. Some of our explanatory variables are highly correlated, which raises some possible collinearity issues which we explore in our multivariate empirical tests in the next section.

[Insert Table 4 About Here]

In the first subpanel of Table 5 we contrast angel and PE and VC deals and test for differences in means. Angels always make smaller-size deals than those of PE and VC investors and their investments are in more active investee firms. Angels also invest in firms with fewer employees. The geographical pattern of angel investments differs from that of PE and VC deals. Means difference tests show that angels invest more in countries that are wealthier and have a larger stock market, that have a more effective legal system, and that have a culture favoring individualism and entrepreneurial risk-taking. Compared to PE and VC investors, angels are less successful in either taking the investee firms public or having them be acquired.

To address a possible sample selection bias that might cause problems for our comparison study, we use propensity score (PS) matching (Rosenbaum and Rubin, 1983; Lee and Wahal, 2004). This allows us to generate

two subsamples to perform counterfactual analyses in order to further validate our main hypotheses. We want to find the impact of angel funding compared to that of PE and VC funding, i.e. whether investee firms would have been better off with the former or the latter.

It is possible that PE and VC investors choose to invest in firms that fit their exit strategies. But, what if angels could invest in firms and deals which are similar to those of PE and VC investors? What would the exit outcomes be? Is there any certification effect from angels? Such potential endogeneity problems may be particularly important for successful exits.

To create the first subsample, we matched firms based on industry and deal size. We then generated a second subsample by matching angel and PE and VC deals based on all the characteristics listed in the first subpanel of Table 5. In the other two subpanels in Table 5 we present the results for differences in means for those two matched samples. While the original unmatched sample shows great differences between the deals made by angel and PE and VC investors, those differences almost vanish when using matched samples. This is especially the case for the institutional variables. These matched subsamples can help us limit the selection bias to some extent. We can therefore confidently undertake counterfactual analyses to see whether angels have certification effects on exit outcomes.

[Insert Table 5 About Here]

REGRESSION ANALYSES AND ROBUSTNESS CHECKS

In this section we perform our regression analyses using mainly probit models, controlling for year, industry, and country fixed effects. We report the marginal effects of each explanatory variable. We note at the outset that our sample and regression analyses do not involve direct natural experiments with clearly exogenous changes (such as death or war or natural disasters) and hence we are unable to show causality; nevertheless, we assess robustness through several subsample tests before drawing inferences from the data.

What factors explain differences between angel and PE/VC investments?

In Table 6 we show the results of our probit models that explain the factors affecting the choice between different types of angel financing and PE and VC financing. In Models (1) to (4), the choice is between all types of angel financing and PE and VC financing; in model (5) between pure angel financing and PE and VC financing; in model (6) between mixed angel financing and PE and VC financing. We test for economic and stock market conditions, legal environments, investee firm characteristics, as well as Ronen and Shenkar (2013) cultural zones, together with Hofstede's cultural dimensions. The main probit regression models in Table 6 use the following specification:

Investor Type = f (Economic and stock market conditions, legal environments, investee firm characteristics, Hofstede's cultural dimensions, cultural zone dummies, industry and country dummies)

Most of the major variables are defined in Table 3. We are aware that there are many explanatory variables that we could have included but have not. The primary reasons for our parsimonious specification are (1) the selected variables are plausible determinants of investment choices, and (2) the excluded variables are highly collinear, hence their inclusion would potentially introduce spurious results into the regressions; this is the case for possible additional dimensions of Hofstede's cultural variables, as well as other legal and institutional variables. In unreported tests we included all six dimensions of Hofstede's cultural variables and the main results did not change, with individualism and uncertainty avoidance remaining the most significant factors. Likewise, replacing the minority shareholder protection index with other legal variables, such as a country's legal origin, did not change the results.

To investigate which features of the institutional environment affect the choice between angel and PE and VC investments, we add variables one at a time in Models (1) to (4). In Model (1) of Table 6, Panel A, we use the natural logarithm of GDP per capita to proxy for economic condition and the natural logarithm of domestic stock market capitalization, as well as the MSCI returns, to proxy for local stock market conditions. We find that,

without considering other institutional factors and firm-level characteristics, angels invest more in countries with higher GDP per capita and in those with smaller but higher-return stock markets.

In Model (2) we add a minority shareholder protection index to capture legal environments. The minority shareholder protection index is the weighted average of ten key legal provisions identified by legal scholars as being most relevant to the protection of minority shareholder rights (Guillén and Capron, 2015).[3] Higher values indicate more effective legal systems providing better minority shareholder protection.[4] The results of Model (2) show that the marginal effect of the minority shareholders protection index is negative. Relative to PE and VC investors, angels invest more in countries with a less effective legal environment. Hellmann and Thiele (2015) suggest that angels prefer making deals with firms located in such countries as contracting costs are usually lower. For example, Scheela and Jittrapanun (2012) show that although angels find it challenging to invest in Thailand, where legal support for investors is weak, they do so because investing there is lucrative. Another reason why angels invest in such countries is that PE and VC funds are less likely to risk doing so and hence local firms have to turn to angels.

In model (3) of Table 6 we test for the impact of investee firm-level characteristics with two variables, size and degree of funding activity. We measure size by the natural logarithm of the number of employees, and the funding activity of investee firms by the yearly number of deals they receive. The introduction of these two variables reduces the statistical significance of our three economic variables while the minority protection index remains significant as before. Compared to PE and VC investors, angels invest more in smaller sized but more active borrowers.

Multiple international studies have shown that culture explains institutional differences (Tung and Verbeke, 2010; Hofstede, 2010; Schwartz, 1999, 2014; Ronen and Shenkar, 2013; Beugelsdijk et al., 2017). Many empirical

[3] The detailed definitions of those ten legal provisions are in Guillén and Capron (2015) Table 1: (1) power of the general meeting for de facto changes, (2) agenda-setting power, (3) the anticipation of a facilitated shareholder decision, (4) prohibition of multiple voting rights, (5) independent board members, (6) feasibility of director dismissal, (7) private enforcement of director duties (derivative suit), (8) shareholder action against general meeting resolutions, (9) mandatory bid, and (10) disclosure of major share ownership (see also Lele and Siems, 2007; Siems, 2008).

[4] The authors are grateful to Mauro Guillén and Laurence Capron for sharing their minority shareholders protection index. This legal index is dynamic over the years to capture a more comprehensive legal environment with more countries and years covered. Given that angels mainly hold non-controlling shares, this index is suitable for capturing the expected legal protection environment for angels.

ones have confirmed that cultural differences are more region-specific than country-specific, which suggests entering variables at the supra-national level (Beugelsdijk et al., 2017). We therefore enter in model (4) of Table 6 the country clusters identified by Ronen and Shenkar (2013). In addition, following the literature confirming that culture also affects entrepreneurship at the national level (Shane, 1993; Hayton, George and Zahra, 2002; Cumming, Johan, and Zhang, 2014), we choose two of the six Hofstede cultural dimensions, individualism (IDV) and uncertainty avoidance (UAI). The results of Model (4) show that the cultural environment is a significant factor affecting angel investments. With the Anglo cultural zone as the omitted category, we find that angels invest more than PE and VC investors in Germanic, Latin American, and Latin European cultural zones but less in the Nordic cultural zone. We also find that angels invest more than PE and VC investors in countries having cultures favoring entrepreneurial risk-taking.

Up to now, we have investigated the factors that differentiate between all angel and PE and VC investors. We now differentiate between pure angels and mixed angels. In Model (5) of Panel A, we compare PE and VC investors with pure angels using the explanatory variables of Model (4) The results show that when angels work alone, they invest more in smaller sized but more active entrepreneurial firms located in less wealthy countries with less effective legal environments but better stock market returns. In model (6) of Panel A, we re-run model (5) with mixed angels. The results are similar to those of Model (4) which dealt with all angels. Thus, Hypothesis 1 is partially supported.

In panel B of Table 6 we perform our first robustness check by considering only first-round deals. As most angels are involved in early and seed stages of start-up development, our results should be more compelling if H1 held at these initial stages. Models (7) to (12) replicate the specifications of Models (1) to (6) in Panel A, and the results fully support H1: Differences in legal, economic, and cultural conditions are even better predictors of the choice between angel and PE and VC investors and the coefficients are even more statistically significant.

In addition to this one, we perform two additional robustness tests. We use two PS-matched samples, a subsample excluding U.S. deals and one involving deals by angels and VCs. The results are presented in Panels C and D of Table 6. We replicate models (4) and (10) with these subsamples and find support for H1. When controlling for Ronen and Shenkar (2013) cultural zones, the host country's individualism and uncertainty

avoidance indexes explain the choice between angel and PE and VC investments. H1 is also supported in the two PS-matched subsamples, with at least one variable in each category being significant. Excluding U.S. observations from our sample does not substantially affect the results, with only the sign of LN of GDP per capita changing due to the large share of U.S. observations in our sample. When we exclude PE investments, we find that legal, economic, and cultural conditions are even stronger determinants of the differences between angel and VC investments.

[Insert Table 6 About Here]

Is there a certification effect from angel investors on successful exits?

Now that we have shown what explains differences between angels and PE and VC investments, we investigate whether angels receive higher or lower returns than other investors. Since it is hard to obtain credible performance measures like internal rates of return or performance multiples, we follow previous literature (Shane, 2005; Wiltbank, 2005; DeGennaro & Dwyer, 2014) and use successful exit rates as an alternative measure of performance. Successful exits involve either an IPO or an acquisition. As in Table 6, we use probit models in Table 7 with year, industry and cultural zone fixed effects. Our main regression models use the following specification:[5]

Successful Exits Type = f (Investor type dummy, economic and stock market conditions, legal environments, investee firm characteristics, Hofstede's cultural dimensions, industry and cultural zone dummies)

[5] For conciseness, we exclude showing all control variables which contain exactly the same variables in Table 6: LN of GDP per capita, LN of Domestic Market Capitalization, MSCI Returns, Minority Protection Index, LN of Number of Employees, Number of Deals per Year, IDV, and UAI. These variables are all excluded in Tables 7 and 8.

We report the results for all successful exits, and those for IPOs and acquisitions separately. We also perform interaction tests with the minority shareholders protection index to determine whether a better legal environment can help increase successful exit performance. In addition, we perform robustness checks with a non-U.S. subsample and one of only angel and VC deals.

In Table 7, Panel A, the dependent variables in Models (1) to (8) are dummy variables indicating whether the deal was a successful exit, either through IPO or acquisition. In Models (1) to (3), all three angel investor type dummies take a significantly negative sign (at the 1% level) confirming H2a, which posits that firms funded by angels have a lower probability of exiting successfully by either IPO or acquisition than those funded by PE and VC investors. Angel-funded firms are 26.65% less likely to exit successfully than those funded by PEs and VCs; they are also 8.19% less likely to exit by IPO and 20.71% less likely to exit by acquisition. Our results thus suggest that angels do not have a certification effect. Note that if we interact the minority shareholders protection index with the angel-related investor type dummies in Models (4) to (6), we find that the legal environment is very important for the quality of the capital market. As predicted in H2a, more effective legal protection can help increase successful exit rates for angels, especially through IPOs. Model (5) shows that more effective legal protection of minority shareholders increases the likelihood that angels will exit through IPOs but Model (6) shows that this is not true for exits through acquisitions. In addition, we find that when we test H2a on our non-U.S. sample, our results are consistent with those found for the whole sample, with angel-funded firms outside the U.S. still 13.35% less likely to exit successfully than those funded by PE and VC investors. If we exclude PE deals, the coefficients of all our variables lose significance.

Panels B and C show the results of additional robustness checks based on our two matched samples. What happens when angels are investing in firms with the same characteristics as those funded by PE and VC funds? We have previously found that certification effects only apply to PE and VC investors; we do not find evidence of a certification effect of angels on exit outcomes. The results of Models (9) to (11) in Panel B of Table 7 are similar to those of Panel A, with the signs for angel funding negative and statistically significant at a 1% level. Hence angels do not provide certification as PE and VC investors do, even if they are investing in firms with almost the same characteristics. The interaction tests also confirm previous results that show that better legal protection can

help increase successful exit rates for angels, especially for IPO exits. However, we cannot find significant support for this proposition when using a non-U.S. subsample. Using our second matched sample, where deals are matched based on all the characteristics listed in the first subpanel of Table 5, yields results similar to those obtained using our first matched sample (see Panel C of Table 7). It seems that PE and VC funds can bring more expertise to the investee firms and have a higher likelihood of exiting their investments by IPO or acquisition. There might be other unobserved characteristics that can explain such results, but by using propensity score matching we provide another robustness check for our main results.

[Insert Table 7 About Here]

Although our tests in Table 7 help support H2a, we speculated whether angels could provide favorable signals to future investors or buyers. We created a dummy variable to capture those firms that have received their first-round funding from angels and re-ran tests similar to those of Table 7 to explore this possibility. In Table 8, we included the new dummy variable as the main explanatory variable with different exit dummies as dependent variables. The results from Table 8 do not support H2b and show that firms receiving angel investments in their first round have a relatively lower probability of exiting successfully, especially through acquisitions. While the coefficient for angel financing in model (2) is statistically insignificant, those for models (1) and (3) are significantly negative, showing that angels do not act as stepping stones, at least not in our dataset.

[Insert Table 8 About Here]

DISCUSSION OF LIMITATIONS AND POSSIBLE FUTURE DATASETS

In this study, we find that legal, economic, and cultural conditions are important determinants of the choice between angel and PE and VC funding. But our study is not without limitations. Perhaps the most notable one is that we cannot fully rule out endogeneity, as many angel deals are not included in the PitchBook dataset. We have considered many robustness checks, including but not limited to excluding various countries from our analyses,

and found the results to be consistent with those reported in the main text here and in the Online Appendix. But the PitchBook dataset and our empirical tests do not enable a perfect assessment of causality as we do not have a natural experiment that affords a clearly exogenous test. Furthermore, there is substantial heterogeneity across angels and we do not have data on the financial performance of investee firms. Having this information would facilitate further study on this topic.

We did a number of robustness checks to assess as fully as possible the relationships between the variables. Further checks and tests are presented in the accompanying Online Appendix. We first present additional descriptive statistics on various subsamples and then the results of additional robustness checks. We hope our work will inspire scholars to continue to conduct research in this area and to look for future data sources with more comprehensive coverage.

CONCLUSIONS AND FUTURE RESEARCH DIRECTIONS

We provide new evidence that legal, economic, and cultural conditions determine whether a firm will be funded by individuals or by organizations. We examine and compare angel investment and private equity and venture capital fund investment to test theoretical arguments suggesting that legal, economic, and cultural institutions have a more pronounced impact on individuals than on organizations.

Our analysis exploits comprehensive data collected at the deal level of investee firms from PitchBook. This database of 85,940 completed deals in 96 countries spans a 36-year period from 1977 to 2012. Among those deals, 5,397 in 42 countries involved angels (either investing on their own or with PE and/or VC funds). This dataset allowed us to compare angel and PE and VC investments at the deal level and the investee-firm level at the same time. We found that, relative to PE and VC funds, angels invest in smaller sized, more active entrepreneurial firms located in countries with less effective legal environments and with more individualistic and risk-taking cultures. This holds true both for first-round deals and deals at all other stages. We also found that, relative to PE and VC funds, firms funded by angels have a lower probability of having successful exits through either IPOs or acquisitions; but that more effective legal environments can help mitigate negative effects on IPO exits. Moreover, in our subsample tests, we do not find evidence that angels act as a stepping stone, because firms that received

angel investments in the first round have a lower probability of successful divesting in later rounds. Our results are robust under various clustering methods to correct standard errors while controlling for fixed effects and are also robust when performing propensity score matching.

Angels are still an under-researched topic. We believe that with more credible data future researchers will be able to shed even more light on what opportunities angels prefer, how they make investments--both domestically and internationally, where their preferred locations are, how they syndicate or co-invest with other investors, which financial contracts they are likely to use, what the real relationship between entrepreneurs and angels is, and how their heterogeneity impacts their investments.

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Figure 1: Angel Activity Trends from 1977 - 2012

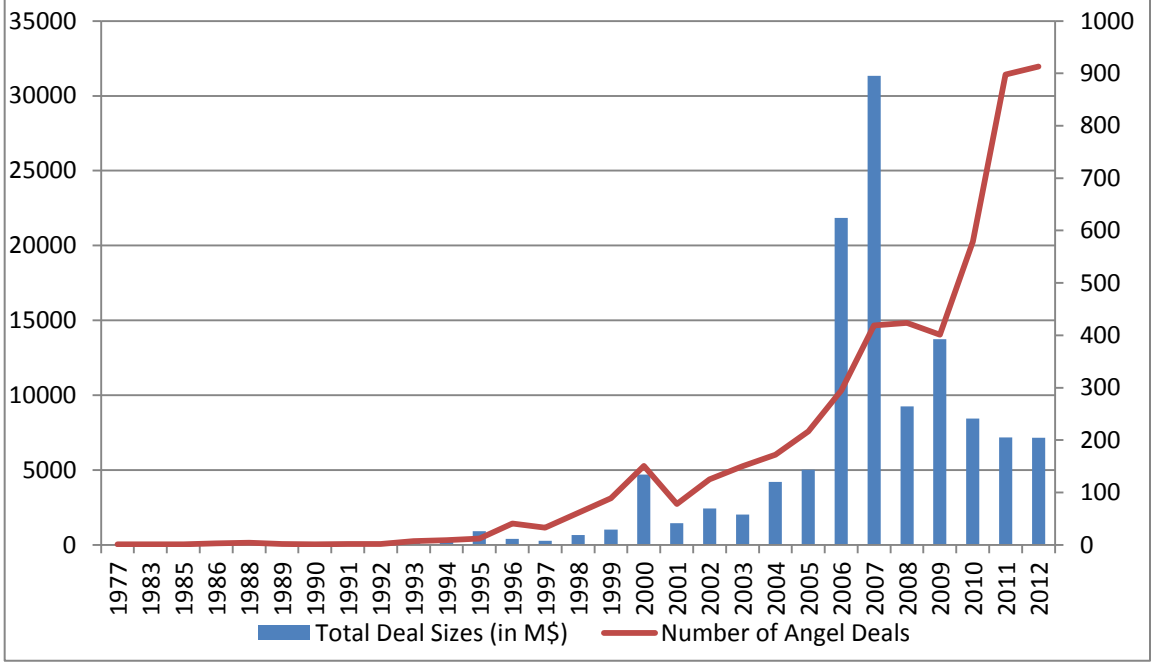

Figure 2: PE and VC Activity Trends from 1977 - 2012

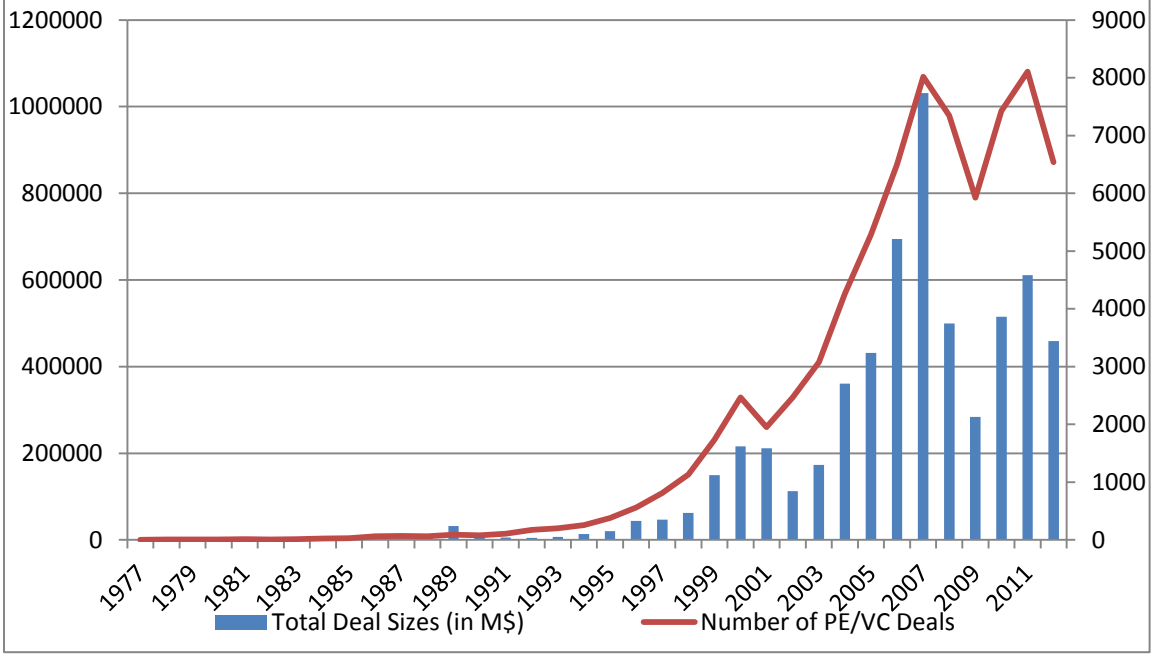

Table 1. Top 10 Country and Industry Distribution for Completed Deals

This table summarizes the key features associated with the sample distribution of completed deals in the world. In this table, we show the top 10 countries and industry distribution for those completed deals in three separate groups: All Deals, Angels Deals, and PE and VC Deals.

Panel A: Top 10 Countries in terms of Number of Deals

All Deals		Angels Deals		PE and VC Deals	
Country		*Country*		*Country*	
United States	73910	United States	4839	United States	69071
Canada	2770	Canada	143	Canada	2627
United Kingdom	2281	United Kingdom	123	United Kingdom	2158
India	735	Israel	52	India	694
Germany	661	India	41	Germany	623
France	592	Germany	38	France	569
China	516	France	23	China	500
Israel	512	Ireland	17	Israel	460
Netherlands	306	China	16	Netherlands	299
Ireland	255	Spain	11	Australia	239

Panel B: Top 10 Industries in terms of Number of Deals

All Deals		Angels Deals		PE and VC Deals	
Industry		*Industry*		*Industry*	
Software	17235	Software	2129	Software	15106
Commercial Services	10096	Media	612	Commercial Services	9570
Commercial Products	6751	Commercial Services	526	Commercial Products	6624
Media	4809	Pharmaceuticals and Biotechnology	262	Healthcare Devices and Supplies	4554
Healthcare Devices and Supplies	4794	Healthcare Devices and Supplies	240	Pharmaceuticals and Biotechnology	4279
Pharmaceuticals and Biotechnology	4541	Retail	196	Media	4197
Communications and Networking	3675	Communications and Networking	156	Communications and Networking	3519
Healthcare Services	2833	Commercial Products	127	Healthcare Services	2758
Consumer Non-Durables	2509	IT Services	114	Consumer Non-Durables	2417
Computer Hardware	2379	Computer Hardware	94	Computer Hardware	2285

Table 2. Country Distribution Characteristics at the Portfolio Firm-Level and Deal-Level -- Angel Activities in All Rounds, First Round, and Exits in Percentages

This table summarizes the detailed features associated with the country distribution of portfolio firms and completed deals in the world. In Panel A, we show the total number of investee firms in each country and the associated angel activity percentages, both in all rounds and in the first round, as well as the percentage of portfolio firms with successful exits. In Panel B, we show the total number of completed deals in each country and the associated angel activity percentages both in all rounds and in the first round, as well as the percentage of portfolio firms with successful exits.

	Panel A: Investee Firm-Level Country Distribution Characteristics				**Panel B: Deal-Level Country Distribution Characteristics**			
Country	Total Number of Firms	% of Firms with Angel Financing, all rounds	% of Firms with Angel Financing, first round	% of Firms with Successful Exits	Total Number of Deals	% of Deals with Angel Financing, all rounds	% of Deals with Angel Financing, first round	% of Deals as successful exits
Argentina	24	25.00	20.83	20.83	44	13.64	11.36	11.36
Australia	177	3.39	3.39	23.73	247	3.24	2.43	17.81
Austria	37	2.70		18.92	64	1.56		14.06
Belgium	73	6.85	4.11	24.66	138	4.35	2.17	16.67
Bermuda	53	13.21	11.32	41.51	126	6.35	4.76	18.25
Brazil	120	5.00	4.17	19.17	185	4.32	2.70	15.68
Bulgaria	17	5.88		29.41	34	2.94		14.71
Canada	1542	7.85	6.16	23.15	2770	5.16	3.43	13.94
Chile	23	4.35		13.04	34	2.94		8.82
China	273	5.13	4.40	21.98	516	3.10	2.33	12.21
Colombia	19	5.26	5.26	36.84	28	3.57	3.57	32.14
Croatia	1	100.00			2	50.00		
Czech Republic	28	3.57		25.00	50	2.00		16.00
Denmark	61	1.64	1.64	13.11	103	1.94	0.97	7.77
Finland	67	8.96	8.96	17.91	105	5.71	5.71	11.43
France	298	5.70	4.36	23.15	592	3.89	2.20	11.99
Germany	369	9.49	8.13	25.75	661	5.75	4.54	15.89
Hong Kong	61	3.28	3.28	18.03	87	2.30	2.30	12.64
India	364	9.34	7.14	14.29	735	5.58	3.54	7.89
Ireland	120	10.83	6.67	20.00	255	6.67	3.14	10.20
Israel	240	16.67	12.08	18.33	512	10.16	5.66	8.79
Italy	104	4.81	4.81	26.92	200	2.50	2.50	17.50
Japan	98	2.04	2.04	20.41	151	1.32	1.32	14.57
Jordan	2	50.00	50.00	50.00	4	25.00	25.00	25.00
Luxembourg	12	16.67	16.67	25.00	29	6.90	6.90	13.79
Mexico	45	4.44		26.67	74	2.70		18.92
Netherlands	161	3.73	2.48	25.47	306	2.29	1.31	14.38

Country	Total Number of Firms	% of Firms with Angel Financing, all rounds	% of Firms with Angel Financing, first round	% of Firms with Successful Exits	Total Number of Deals	% of Deals with Angel Financing, all rounds	% of Deals with Angel Financing, first round	% of Deals as successful exits
Norway	70	1.43		21.43	108	0.93		16.67
Panama	3	33.33	33.33	33.33	4	25.00	25.00	25.00
Poland	30	3.33	3.33	16.67	41	2.44	2.44	12.20
Portugal	20	5.00	5.00		21	4.76	4.76	
Romania	11	9.09	9.09	27.27	13	7.69	7.69	23.08
Russia	36	5.56	2.78	25.00	68	4.41	1.47	13.24
Singapore	50	4.00	4.00	22.00	92	2.17	2.17	14.13
Slovenia	5	20.00	20.00		6	16.67	16.67	
South Africa	20	5.00	5.00		24	4.17	4.17	
South Korea	47	2.13	2.13	27.66	77	1.30	1.30	23.38
Spain	114	6.14	2.63	21.05	207	5.31	1.45	12.08
Sweden	110	2.73	2.73	19.09	179	2.23	1.68	12.29
Switzerland	106	4.72	3.77	25.47	209	2.87	1.91	13.88
United Kingdom	1253	7.82	5.19	20.91	2281	5.39	2.85	12.10
United States	35896	10.56	7.66	21.73	73910	6.55	3.72	11.31
On Average	1003.81	10.87	8.42	23.81	2030.76	6.61	5.00	15.05

Table 3. Variable Definitions and Summary Statistics

This table provides definitions of the main variables in the dataset, the data sources, and summary statistics.

Variable Name	Definition	Mean	Median	Standard Deviation	Minimum	Maximum	Number of observations
Main Dependent Variables							
All Angels Dummy	A dummy variable equal to 1 for deals with angel investor.	0.063	0.000	0.243	0.000	1.000	85940
Pure Angel Dummy	A dummy variable equal to 1 for deals with only one angel investor.	0.017	0.000	0.128	0.000	1.000	85940
Mixed Angels Dummy	A dummy variable equal to 1 for deals with both angel investor and PE and VC investors.	0.046	0.000	0.210	0.000	1.000	85940
Pure PE and VC Dummy	A dummy variable equal to 1 for deals with only PE and VC investors.	0.937	1.000	0.243	0.000	1.000	85940
Firms with First-Round Angel Financing Dummy	A dummy variable equal to 1 for later deals of those investee firms who have received Angel financing in the first round and equals to 0 otherwise.	0.116	0.000	0.320	0.000	1.000	43467
Deal Characteristics							
Deal Size	Firm-level deal size (in M$) for the investee companies.	116.750	10.300	807.991	0.010	101002.500	52922
No. of Deals per Year	Firm-level number of deals has been made in a year for the investee companies.	1.186	1.000	0.523	1.000	11.000	85940
Total No. of Deals	Firm-level total number of deals has been made over the whole sample period for the investee companies.	3.508	3.000	2.889	1.000	41.000	85940
No. of Investors	Firm-level number of investors of each completed deal for the investee companies.	1.909	1.000	1.496	1.000	22.000	85940
Investee Company Characteristics							
Company Valuation	Firm-level valuation (in M$) for the investee companies at the time of deal completed.	611.590	120.355	2853.799	0.010	118802.500	12758
No. of Employees	Firm-level number of employees in the investee companies.	1368.882	110.000	9976.233	1.000	805600.000	42893
LN of No. of Employees	Natural logarithm of firm-level number of employees in the investee companies.	4.860	4.700	2.089	0.000	13.5999	42893

Variable Name	Definition	Mean	Median	Standard Deviation	Minimum	Maximum	Number of observations
Country Characteristics							
GDP per Capita	GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollars. Source: World Bank.	43606.000	47001.430	9418.821	308.535	193892.300	80090
LN of GDP per Capita	Natural logarithm of GDP per capita.	10.625	10.758	0.475	5.732	12.175	80090
Domestic Market Capitalization	The domestic market capitalization of a stock exchange is the total number of issued shares of domestic companies, including their several classes, multiplied by their respective prices at a given time from the World Federation of Exchanges. This figure reflects the comprehensive value of the market at that time, in M$. Source: http://www.world-exchanges.org/statistics/statistics-definitions.	13900000.000	16200000.000	5566940.000	6.200	20300000.000	79782
LN of Domestic Market Capitalization	Natural logarithm of domestic market capitalization.	16.200	16.601	1.038	1.825	16.828	79782
MSCI Returns	The country-specific Morgan Stanley Capital International index return, a proxy for stock market conditions in each country.	0.054	0.094	0.157	-0.684	1.437	79891
Minority Shareholders Protection Index	The minority shareholders protection index is the coded weighted average index on the ten key legal provisions identified by legal scholars as most relevant to the protection of minority shareholder rights (as per Guillen and Capron, 2015): powers of the general meeting for de facto changes; agenda-setting power; anticipation of shareholder decision facilitated; prohibition of multiple voting rights; independent board members; feasibility of directors' dismissal; private enforcement of directors' duties (derivative suit); shareholder action against resolutions of the general meeting; mandatory bid; and disclosure of major share ownership (as per Lele and Siems, 2007 and Siems, 2008). Higher values indicate "better" degree of minority shareholders' protection and legal systems.	7.019	7.250	0.521	1.000	8.250	77240

Variable Name	Definition	Mean	Median	Standard Deviation	Minimum	Maximum	Number of observations
IDV	Hofstede's index of individualism versus collectivism. The high side of this dimension, called individualism, can be defined as a preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families. Its opposite, collectivism, represents a preference for a tightly-knit framework in society in which individuals can expect their relatives or members of a particular in-group to look after them in exchange for unquestioning loyalty. A society's position on this dimension is reflected in whether people's self-image is defined in terms of "I" or "we." Source: http://geert-hofstede.com/national-culture.html.	87.88	91	10.976	11	91	85514
UAI	Hofstede's index of uncertainty avoidance. The Uncertainty Avoidance dimension expresses the degree to which the members of a society feel uncomfortable with uncertainty and ambiguity. The fundamental issue here is how a society deals with the fact that the future can never be known: should we try to control the future or just let it happen? Countries exhibiting strong UAI maintain rigid codes of belief and behavior and are intolerant of unorthodox behavior and ideas. Weak UAI societies maintain a more relaxed attitude in which practice counts more than principles. Source: http://geert-hofstede.com/national-culture.html.	46.93	46	7.681	8	112	85514
Anglo Cultural Zone	A dummy variable equal to 1 for Anglo cultural zone, defined by Ronen and Shenkar (2013).	0.923	1	0.267	0	1	89098
Far East Cultural Zone	A dummy variable equal to 1 for Far East cultural zone, defined by Ronen and Shenkar (2013).	0.011	0	0.105	0	1	89098
Germanic Cultural Zone	A dummy variable equal to 1 for Germanic cultural zone, defined by Ronen and Shenkar (2013).	0.012	0	0.107	0	1	89098
Latin America Cultural Zone	A dummy variable equal to 1 for Latin America cultural zone, defined by Ronen and Shenkar (2013).	0.005	0	0.069	0	1	89098
Latin Europe Cultural Zone	A dummy variable equal to 1 for Latin Europe cultural zone, defined by Ronen and Shenkar (2013).	0.020	0	0.140	0	1	89098
Nordic Cultural Zone	A dummy variable equal to 1 for Nordic cultural zone, defined by Ronen and Shenkar (2013).	0.010	0	0.098	0	1	89098
Confucian Asia Cultural Zone	A dummy variable equal to 1 for Confucian Asia cultural zone, defined by Ronen and Shenkar (2013).	0.012	0	0.110	0	1	89098
Near East Cultural Zone	A dummy variable equal to 1 for Near East cultural zone, defined by Ronen and Shenkar (2013).	0.001	0	0.028	0	1	89098
Arab Cultural Zone	A dummy variable equal to 1 for Arab cultural zone, defined by Ronen and Shenkar (2013).	0.000	0	0.016	0	1	89098
East Europe Cultural Zone	A dummy variable equal to 1 for East Europe cultural zone, defined by Ronen and Shenkar (2013).	0.000	0	0.020	0	1	89098
		0.003	0	0.058	0	1	89098
Exit Outcomes							
Successful Exits	A dummy variable equal to 1 for either IPO or Acquisition exit.	0.116	0	0.320	0	1	85940
IPO Exits	A dummy variable equal to 1 for an IPO exit.	0.017	0	0.128	0	1	85940
Acquisition Exits	A dummy variable equal to 1 for an Acquisition exit.	0.099	0	0.298	0	1	85940

Table 4. Pair-wise Correlations Matrix

This table provide correlations across the main variables in the dataset. * Significant to at least the 5% level of significance.

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]
[1]	All Angels Dummy	1.00																		
[2]	Pure Angel Dummy	0.50*	1.00																	
[3]	Mixed Angels Dummy	0.85*	-0.03*	1.00																
[4]	Pure PE and VC Dummy	-1.00	-0.50*	-0.85*	1.00															
[5]	LN of GDP per capita	0.03*	0.01*	0.03*	-0.03*	1.00														
[6]	LN of Domestic Market Capitalization	0.03*	0.01*	0.02*	-0.03*	0.42*	1.00													
[7]	MSCI Returns	0.00	0.01	0.00	0.00	-0.11*	-0.02*	1.00												
[8]	Minority Protection Index	0.04*	0.02*	0.03*	-0.04*	0.42*	0.59*	-0.11*	1.00											
[9]	LN of Number of Employees	-0.12*	-0.06*	-0.10*	0.12*	-0.23*	-0.22*	0.07*	-0.23*	1.00										
[10]	Number of Deals per Year	0.02*	0.02*	0.01*	-0.02*	0.02*	0.04*	-0.01	0.04*	0.03*	1.00									
[11]	IDV	0.02*	0.01*	0.02*	-0.02*	0.69*	0.72*	-0.07*	0.42*	-0.20*	0.03*	1.00								
[12]	UAI	-0.01*	0.00	-0.01	0.01*	-0.06*	-0.38*	-0.01*	-0.19*	0.09*	-0.01*	-0.38*	1.00							
[13]	Successful Exits	-0.09*	-0.04*	-0.08*	0.09*	-0.01	-0.02*	0.03*	-0.03*	0.10*	-0.05*	-0.01*	0.01*	1.00						
[14]	IPO Exits	-0.03*	-0.02*	-0.03*	0.03*	-0.06*	-0.04*	0.06*	-0.07*	0.14*	0.02*	-0.03*	0.00	0.36*	1.00					
[15]	Acquisition Exits	-0.08*	-0.04*	-0.07*	0.08*	0.02*	-0.01	0.01*	0.00	0.04*	-0.07*	0.00	0.01*	0.92*	-0.04*	1.00				
[16]	Deal Size	-0.03*	-0.02*	-0.03*	0.03*	0.00	-0.05*	0.02*	-0.04*	0.22*	-0.01	-0.04*	0.03*	0.10*	0.02*	0.10*	1.00			
[17]	Company Valuation	0.00	0.01	0.00	0.00	-0.01	-0.04*	0.02*	-0.01	0.22*	0.29*	-0.06*	0.04*	0.01	0.05*	-0.02*	0.71*	1.00		
[18]	Total No. of Deals	0.00	0.00	-0.01	0.00	0.00	0.06*	-0.04*	0.01	0.06*	0.46*	0.07*	-0.03*	-0.04*	0.06*	-0.07*	-0.01*	0.26*	1.00	
[19]	No. of Investors	0.15*	-0.08*	0.23*	-0.09*	0.02*	0.03*	-0.02*	0.00	-0.15*	-0.01*	0.03*	-0.02*	-0.20*	-0.08*	-0.18*	-0.01*	0.04*	0.11*	1.00

Table 5. Mean Descriptive Statistics -- Unmatched vs. Matched Sample Means Comparisons

This table provides the main mean descriptive statistics across different main characteristics by Angel Deals vs. PE/VC Deals. The table also provides the two-sample means test results between major characteristics groups in our data. We present three subpanel analyses; the first subpanel shows the previous unmatched original sample characteristics, and the subsequent two subpanels are based on propensity score matching methods based on two different criteria. In the first subsample, we performed PS matching, based on the deal sizes and investee firm industries as PE/VC funds' selection criteria to match angels' criteria. Then we posed stricter matching criteria based on all characteristics, as presented in the first subpanel of Table 5 to generate the second subsample. The means test is a two-sample t-test with equal variance. *, **, *** Significant at the 10%, 5%, and 1% levels, respectively.

	Original Sample: Angel Deals vs. PE and VC Deals			***PS Matching Sample 1:*** Angel Deals vs. PE and VC Deals			***PS Matching Sample 2:*** Angel Deals vs. PE and VC Deals		
	Angel Deals	PE and VC Deals	Mean Differences	Angel Deals	PE and VC Deals	Mean Differences	Angel Deals	PE and VC Deals	Mean Differences
Deal Characteristics									
Deal Size	27.821	124.884	-97.063***	427.658	405.161	22.498	427.658	287.757	139.901
No. of Deals per Year	1.223	1.183	0.040***	1.243	1.139	0.104	1.243	1.174	0.069
Total No. of Deals	3.482	3.509	-0.028	4.389	3.569	0.819	4.389	3.361	1.028**
No. of Investors	2.799	1.849	0.950***	2.771	1.576	1.194***	2.771	1.688	1.083***
Investee Company Characteristics									
Company Valuation	595.046	611.848	-16.802	761.922	712.460	49.461	761.922	516.034	245.888
No. of Employees	509.982	1413.984	-904.002***	3789.896	1623.306	2166.590	3789.896	2268.514	1521.382
Country Characteristics									
GDP per Capita	45513.550	43476.870	2036.683***	41747.430	41921.746	-174.316	41747.430	42077.268	-329.838
Domestic Market Capitalization	14700000.000	13900000.000	846793.600***	12685752.300	13938458.200	-1252705.890*	12685752.300	14608973.700	-1923221.410***
MSCI Returns	0.057	0.054	0.003	0.066	0.056	0.010	0.066	0.073	-0.007
Minority Shareholders Protection Index	7.093	7.011	0.082***	6.884	6.974	-0.090	6.884	6.950	-0.066
IDV	88.840	87.819	1.021***	88.007	89.618	-1.611	88.007	89.264	-1.257
UAI	46.726	46.942	-0.217**	45.847	46.035	-0.188	45.847	46.340	-0.493
Exit Outcomes									
Successful Exits	0.005	0.123	-0.118***	0.042	0.257	-0.215***	0.042	0.306	-0.264***
IPO Exits	0.000	0.018	-0.018***	0.007	0.056	-0.049**	0.007	0.111	-0.104***
Acquisition Exits	0.005	0.105	-0.100***	0.035	0.201	-0.167***	0.035	0.194	-0.160***

Table 6. Probit Regression Models for H1

This table presents probit model results of the factors of Angel versus PE/VC investments, and we report the associated marginal effects on those factors. All dependent variables across Models (1) to (20) are different indicator dummy variables to capture All Angels, Pure Angel, and Mixed Angel; all other variables are as defined in Table III. Panel A presents results of the original sample; Panel B presents results of the subsample of only the first-round deals; Panel C presents results on All Angels by using two PS-matched samples, a non-US sample, and a subsample including only VC and angels; Panel D presents results on All Angels by using two PS-matched samples, a non-US sample, and a subsample including only VCs and angels, but with restrictions of only first-round deals. *, **, *** Significant at the 10%, 5%, and 1% levels, respectively.

Panel A: For All Rounds Deals

	Model (1)		Model (2)		Model (3)		Model (4)		Model (5)		Model (6)	
	All Angels		All Angels		All Angels		All Angels		Pure Angel		Mixed Angels	
	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score
LN of GDP per capita	0.1259	2.89***	0.1961	3.43***	0.0262	1.15	-0.0087	-0.82	-0.0088	-1.85*	-0.0015	-0.18
LN of Domestic Market Capitalization	-0.0381	-1.95*	-0.0535	-2.96***	-0.0098	-1.10	0.0052	1.31	0.0021	1.26	0.0035	1.17
MSCI Returns	0.0360	2.00**	0.0418	2.51**	0.0208	1.93*	0.0149	1.59	0.0077	3.13***	0.0072	0.92
Minority Protection Index			-0.0303	-2.58***	-0.0206	-3.36***	-0.0146	-3.68***	-0.0042	-2.76***	-0.0104	-3.05***
LN of Number of Employees					-0.0120	-8.67***	-0.0120	-8.22***	-0.0031	-9.09***	-0.0091	-6.87***
Number of Deals per Year					0.0062	2.69***	0.0065	2.86***	0.0024	2.00**	0.0040	2.09**
IDV							0.0010	1.00	0.0001	0.45	0.0009	0.91
UAI							-0.0017	-2.50**	-0.0002	-0.46	-0.0015	-3.39***
Far East Cultural Zone							0.0268	0.49	-0.0091	-0.43	0.0215	0.40
Germanic Cultural Zone							0.0680	2.49**	-0.0019	-0.13	0.0646	2.51**
Latin America Cultural Zone							0.1149	1.99**	0.0120	0.63	0.0967	1.76*
Latin Europe Cultural Zone							0.0920	2.26**	0.0108	0.53	0.0805	2.54**
Nordic Cultural Zone							-0.1004	-2.78***			-0.0708	-2.28**
Confucian Asia Cultural Zone							0.0017	0.02			0.0231	0.35
F.E. Industry	Yes		Yes		Yes		Yes		Yes		Yes	
F.E. Country	Yes		Yes		Yes		No		No		No	
F.E. Year	Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	79229		76651		39304		39728		38494		39684	
Pseudo R2	0.0609		0.0627		0.0709		0.072		0.0673		0.0634	

Table 6. Probit Regression Models for H1 (Continued)

Panel B: For Only First-Round Deals												
	Model (7)		Model (8)		Model (9)		Model (10)		Model (11)		Model (12)	
	All Angels		All Angels		All Angels		All Angels		Pure Angel		Mixed Angels	
	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score
LN of GDP per capita	0.2251	4.47***	0.2891	4.84***	0.1488	3.19***	-0.0015	-0.08	0.0017	0.15	0.0037	0.24
LN of Domestic Market Capitalization	-0.0779	-3.46***	-0.0928	-4.50***	-0.0556	-3.27***	0.0003	0.04	0.0003	0.08	-0.0024	-0.46
MSCI Returns	0.0449	2.08**	0.0501	2.58***	0.0362	1.92*	0.0166	0.71	0.0079	1.42	0.0101	0.49
Minority Protection Index			-0.0277	-2.34**	-0.0290	-2.36**	-0.0017	-0.27	-0.0072	-2.65***	0.0029	0.53
LN of Number of Employees					-0.0117	-5.82***	-0.0121	-5.29***	-0.0047	-5.27***	-0.0082	-4.33***
Number of Deals per Year					0.0357	5.87***	0.0366	6.36***	0.0115	3.60***	0.0252	5.56***
IDV							0.0032	2.21**	0.0041	2.69***	0.0019	1.69*
UAI							-0.0013	-1.97**	0.0010	0.84	-0.0011	-2.29**
Far East Cultural Zone							0.1340	1.48	0.1974	2.11**	0.0831	1.24
Germanic Cultural Zone							0.1228	3.42***	0.0631	2.71***	0.0899	3.19***
Latin America Cultural Zone							0.1724	1.90*			0.1280	1.74*
Latin Europe Cultural Zone							0.1100	2.20**	0.0154	0.28	0.0808	2.01**
Nordic Cultural Zone							-0.0388	-0.90			-0.0262	-0.77
Confucian Asia Cultural Zone							0.1606	1.75*			0.1007	1.37
F.E. Industry	Yes		Yes		Yes		Yes		Yes		Yes	
F.E. Country	No		No		No		No		No		No	
F.E. Year	Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	37301		35981		15876		16175		14530		16150	
Pseudo R2	0.1043		0.1072		0.1177		0.1167		0.1345		0.0887	

Table 6. Probit Regression Models for H1 (Continued)

Panel C: Robustness Checks using Matched Samples and Non-US sample - All Rounds Deals								
	Model (13)		Model (14)		Model (15)		Model (16)	
	All Angels (Matched Sample 1)		All Angels (Matched Sample 2)		All Angels (Non-US Subsample)		All Angels (VC Deals Only)	
	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score
LN of GDP per capita	0.0220	2.20**	0.5076	2.18**	-0.0221	-2.46**	0.0177	0.53
LN of Domestic Market Capitalization	-0.0078	-1.56	-0.1804	-0.75	0.0018	0.47	-0.0189	-1.44
MSCI Returns	-0.0060	-0.76	-0.1383	-0.75	0.0026	0.26	0.1039	3.34***
Minority Protection Index	-0.0080	-1.93*	-0.1852	-1.96**	-0.0122	-2.89***	-0.0370	-2.53**
LN of Number of Employees	-0.0009	-0.92	-0.0211	-0.94	-0.0055	-4.12***	-0.0057	-1.71*
Number of Deals per Year	0.0041	2.35**	0.0951	2.31**	0.0064	0.94	-0.0069	-1.17
IDV	0.0003	0.30	0.0075	0.30	0.0008	1.46	0.0020	0.55
UAI	-0.0015	-2.62***	-0.0336	-2.50**	-0.0010	-2.58***	-0.0063	-2.67***
Ronen & Shenkar Cultural Zones	Yes		Yes		Yes		Yes	
F.E. Industry	Yes		Yes		Yes		Yes	
F.E. Country	No		No		No		No	
F.E. Year	Yes		Yes		Yes		Yes	
Number of Observations	7660		7660		2993		13035	
Pseudo R2	0.0721		0.0721		0.1002		0.0414	
Panel D: Robustness Checks using Matched Samples and Non-US sample - First-Round Deals Only								
	Model (17)		Model (18)		Model (19)		Model (20)	
	All Angels (Matched Sample 1)		All Angels (Matched Sample 2)		All Angels (Non-US Subsample)		All Angels (VC Deals Only)	
	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score
LN of GDP per capita	0.0418	2.30**	0.0418	2.30**	-0.0429	-2.71***	0.1942	2.92***
LN of Domestic Market Capitalization	-0.0195	-2.52**	-0.0195	-2.52**	-0.0026	-0.53	-0.0543	-2.03**
MSCI Returns	-0.0070	-0.47	-0.0070	-0.47	-0.0144	-0.82	0.1204	1.54
Minority Protection Index	-0.0085	-1.31	-0.0085	-1.31	-0.0064	-1.35	0.0159	0.74
LN of Number of Employees	0.0022	1.82*	0.0022	1.82*	-0.0067	-3.76***	0.0092	1.69*
Number of Deals per Year	0.0109	1.52	0.0109	1.52	0.0048	0.36	0.0292	1.42
IDV	0.0045	1.78*	0.0045	1.78*	0.0021	2.67***	0.0067	1.19
UAI	-0.0008	-0.75	-0.0008	-0.75	-0.0006	-1.03	-0.0066	-2.21**
Ronen & Shenkar Cultural Zones	Yes		Yes		Yes		Yes	
F.E. Industry	Yes		Yes		Yes		Yes	
F.E. Country	No		No		No		No	
F.E. Year	Yes		Yes		Yes		Yes	
Number of Observations	3036		3036		1454		3787	
Pseudo R2	0.0689		0.0689		0.1225		0.0602	

Table 7. Probit Regression Models for Exits Outcomes

This table presents probit model results of the factors of exit outcomes, and we report the associated marginal effects of those factors. The dependent variables across Models (1) to (24) are different dummy variables that capture all successful exits, all IPO exits, and all acquisition exits; all other variables are as defined in Table III. Panel A presents results of the original sample; Panels B and C present results using two PS-matched samples. For conciseness, we exclude all control variables, which contain the exact same variables in Table VI: LN of GDP per capita, LN of Domestic Market Capitalization, MSCI Returns, Minority Protection Index, LN of Number of Employees, Number of Deals per Year, IDV, and UAI. *, **, *** Significant at the 10%, 5%, and 1% levels, respectively.

Panel A: Successful Exits - Original Sample, Non-US and VC Subsamples

	Model (1) Successful Exits		Model (2) IPO Exits		Model (3) Acquisition Exits		Model (4) Successful Exits		Model (5) IPO Exits		Model (6) Acquisition Exits		Model (7) Successful Exits (Non-US)		Model (8) Successful Exits (VC)	
	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score
All Angels	-0.2665	-15.29***	-0.0819	-4.80***	-0.2071	-11.18***	-0.2837	-0.98	-0.6389	-6.37***	0.0057	0.03	-0.1335	-2.14**	0.0010	0.56
All Angels * Minority Protection Index							0.0025	0.06	0.0795	5.29***	-0.0303	-1.12				
Controls	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Ronen & Shenkar Cultural Zones	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
F.E. Industry	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
F.E. Country	No		No		No		No		No		No		No		No	
F.E. Year	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	39876		39649		39876		39876		39649		39876		3379		8777	
Pseudo R2	0.0396		0.1387		0.0338		0.0396		0.1389		0.0338		0.0363		0.1131	

Table 7. Probit Regression Models for Exits Outcomes (Continued)

Panel B: Successful Exits - Matched Sample 1

	Model (9) Successful Exits		Model (10) IPO Exits		Model (11) Acquisition Exits		Model (12) Successful Exits		Model (13) IPO Exits		Model (14) Acquisition Exits		Model (15) Successful Exits (Non-US)		Model (16) Successful Exits (VC)	
	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score
All Angels	-0.4186	-6.53***	-0.1464	-2.84***	-0.3112	-4.58***	-0.6380	-0.90	-2.0189	-4.96***	-0.2575	-0.53	-0.1144	-1.18	0.0014	0.10
All Angels * Minority Protection Index							0.0314	0.31	0.2621	4.34***	-0.0077	-0.11				
Controls	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Ronen & Shenkar Cultural Zones	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
F.E. Industry	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
F.E. Country	No		No		No		No		No		No		No		No	
F.E. Year	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	8065		8030		8065		8065		8030		8065		820		251	
Pseudo R2	0.0599		0.1145		0.0566		0.0599		0.1147		0.0566		0.0962		0.2919	

Panel C: Successful Exits - Matched Sample 2

	Model (17) Successful Exits		Model (18) IPO Exits		Model (19) Acquisition Exits		Model (20) Successful Exits		Model (21) IPO Exits		Model (22) Acquisition Exits		Model (23) Successful Exits (Non-US)		Model (24) Successful Exits (VC)	
	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score
All Angels	-0.4176	-6.29***	-0.1466	-2.85***	-0.3089	-4.38***	-0.6777	-1.07	-2.0771	-5.28***	-0.2160	-0.48	-0.1090	-1.06	0.0014	0.10
All Angels * Minority Protection Index							0.0373	0.42	0.2703	4.61***	-0.0133	-0.21				
Controls	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Ronen & Shenkar Cultural Zones	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
F.E. Industry	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
F.E. Country	No		No		No		No		No		No		No		No	
F.E. Year	Yes		Yes		Yes		Yes		Yes		Yes		Yes		Yes	
Number of Observations	7970		7944		7970		7970		7944		7970		744		251	
Pseudo R2	0.0637		0.1118		0.0606		0.0637		0.1121		0.0606		0.0718		0.2919	

Table 8. Regression Models for Testing First-Round Angel Certification Effect on Exits

This table presents clustered probit model results of the factors of exit outcomes, and we report the associated marginal effects of those factors. We analyze separately the impact of firms with first-round angel finance. All dependent variables across Models (1) to (3) are different, with a dummy variable to capture all successful exits: all IPO exits and all acquisition exits; all other variables are as defined in Table III. For conciseness, we exclude all control variables, which contain the exact same variables in Table VI: LN of GDP per capita, LN of Domestic Market Capitalization, MSCI Returns, Minority Protection Index, LN of Number of Employees, Number of Deals per Year, IDV, and UAI. *, **, *** Significant at the 10%, 5%, and 1% levels, respectively.

	Model (1) Successful Exits		Model (2) IPO Exits		Model (3) Acquisition Exits	
	Marginal Effects	z score	Marginal Effects	z score	Marginal Effects	z score
Firms with First-Round Angel Financing	-0.0432	-5.00***	-0.0031	-0.62	-0.0467	-5.86***
Controls	Yes		Yes		Yes	
Ronen & Shenkar Cultural Zones	Yes		Yes		Yes	
F.E. Industry	Yes		Yes		Yes	
F.E. Country	No		No		No	
F.E. Year	Yes		Yes		Yes	
Number of Observations	23516		23433		23516	
Pseudo R2	0.0584		0.1646		0.0473	